

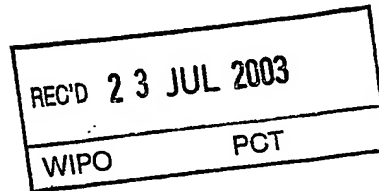


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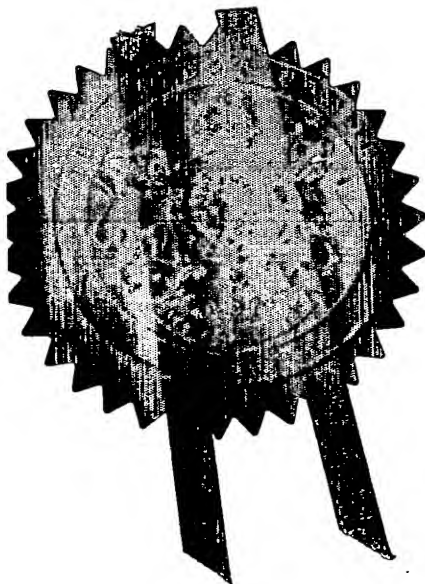
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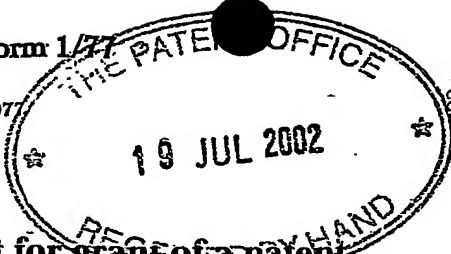
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1. Your reference

P16572GB - NHF/ns

2. Patent application number

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0216900.1

19 JUL 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Autoliv Development AB
Patent Department Sweden
Wallentinsvagen 22
S-447 83 VARGARDA
Sweden

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

SWEDEN

3 2108010

4. Title of the invention

IMPROVEMENTS IN OR RELATING TO A SEAT-BELT BUCKLE ARRANGEMENT

5. Name of your agent (if you have one)

Forrester Ketley & Co.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Forrester House
52 Bounds Green Road
London
N11 2EY

Patents ADP number (if you know it)

133001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

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Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

X

Request for preliminary examination and search (*Patents Form 9/77*)

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Request for substantive examination (*Patents Form 10/77*)

Any other documents
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11. ☒ We request the grant of a patent on the basis of this application.

Signature
Forrester Ketley & Co.
Forrester Ketley & Co.

Date
19 July 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

FRANKLAND, Nigel H.
(020) 8889 6622

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PATENTS ACT 1977

P16572GB-NF/SJP/jsd

DESCRIPTION OF INVENTION

"IMPROVEMENTS IN OR RELATING TO A SEAT-BELT BUCKLE ARRANGEMENT"

THE PRESENT INVENTION relates to a seat-belt buckle arrangement, and more particularly relates to a seat-belt buckle arrangement incorporating a seat-belt buckle and a length of webbing to connect the seat-belt buckle to an anchoring point. The present invention also relates to a method of assembling a seat-belt buckle arrangement.

Seat-belt buckles are widely used in connection with seat-belt arrangements in vehicles such as motor cars. A seat-belt buckle is a component which is configured to receive releasably a tongue which is mounted on the seat-belt. Typically the seat-belt buckle receives the tongue through a slot or opening formed in the buckle, and when the tongue is inserted into the buckle, the tongue is automatically retained within the buckle. The tongue can be released from the buckle by depressing an appropriate actuating button.

Buckles may be secured to anchoring points in motor vehicles in a number of ways but, especially when the buckle is intended for use with a safety-belt provided on a rear seat of a motor vehicle, where the buckle must be

spaced from the anchoring point, the buckle may be secured to the anchoring point by means of a length of webbing.

Seat-belt buckles that are utilised on rear seats are often located at the point where the squab of the rear seat meets with the back-rest of the rear seat. The buckle should have an initial position in which the buckle is not obtrusive, especially if the rear seat is to accommodate three passengers, to enable the passenger who is to have the middle position to slide across the seat without any uncomfortable engagement with the seat-belt buckle. However, it is appropriate for the buckle to have a more protruding position when the buckle is in use.

The present invention seeks to provide an improved seat-belt buckle arrangement, and an improved method of assembling a seat-belt buckle arrangement.

According to a first aspect of the present invention, there is provided a seat-belt buckle arrangement comprising a seat-belt buckle, a webbing strap and a connector, the connector having an elongate element and at least one mounting element connected to or formed integrally with the elongate element for pivotal movement relative to the elongate element, the or each mounting element being resiliently biased to a predetermined position relative to the elongate element, the buckle being mounted on the or each mounting element, the strap having one end which passes around at least part of the connector, that end being superimposed over a main body portion of the strap, and being secured thereto so that the superimposed strap portions embrace the said elongate element.

Preferably, the other end of the strap passes through an aperture formed in an anchor plate, the said other end being superimposed with the main body portion of the strap and being secured thereto to embrace part of the elongate element.

Advantageously, said resilient bias between the or each mounting element and the elongate element is effective to move the buckle to an initial position in which the axis of the buckle is substantially perpendicular to the axis of the elongate element.

Conveniently, the elongate element is formed of metal sheet, one end of the elongate element forming a loop which receives a rod which is pivotal relative to the elongate element, the rod extending to and being connected to arms which extend from the mounting element, the mounting element being constituted by a mounting plate, the or each resilient biasing element engaging the elongate element and a said arm to impart said bias to the mounting element.

Preferably, said resilient bias is effected by at least one resilient biasing element.

Advantageously, the or each said resilient biasing element comprises a helical spring surrounding said rod.

Conveniently, said one end of the strap passes through an aperture in the connector.

Preferably, the or each mounting element and the elongate element are each formed from a single length of bent resilient wire.

Advantageously, the elongate element is defined by an elongate loop of said wire extending between a pair of hook-shaped formations, each said hook-shaped formation defining a respective mounting element for engagement with the buckle.

Conveniently, the region of said wire forming the elongate element, and the region of said wire forming the or each mounting element are joined by a helically wound region of said wire, the helically wound region of wire providing said resilient bias between the or each mounting element and the elongate element.

Preferably, said one end of the strap passes through an aperture in the buckle and around said the or each mounting element.

According to another aspect of the present invention, there is provided a method comprising the steps of passing the said other end of the strap through an aperture formed in the anchor plate, superimposing said other end and the main body portion of the strap, and securing the adjacent edges of the superimposed strap portions together to define a central pocket, inserting the elongate element of the connector into the pocket, passing the said one end of the strap around at least part of the connector and superimposing the one end of the strap over at least part of the main body portion of the strap, and securing the said one end portion of the strap to the said main body portion of the strap to embrace the elongate element.

Preferably, said steps of securing comprise the step of stitching said parts of said strap together.

Advantageously, part of the said one end portion of the strap, when passed around said at least part of the connector, overlies the said other end of the strap, the stitching serving to interconnect the said one end of the strap, the said other end of the strap and the main body part of the strap.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of an anchoring plate forming part of a seat-belt buckle arrangement in accordance with the invention,

FIGURE 2 is a diagrammatic view of a length of webbing,

FIGURE 3 is a perspective view of a connector,

FIGURE 4 is a diagrammatic view of a buckle,

FIGURE 5 is a view showing a first stage in the assembly of a buckle arrangement in accordance with the invention, illustrating the anchoring plate and part of the strap,

FIGURE 6 is a view corresponding to Figure 5 showing a subsequent stage during the manufacture of the buckle arrangement showing the anchoring plate, the strap and the connector,

FIGURE 7 is a view corresponding to Figure 6 showing a further stage during the assembly of the buckle arrangement,

FIGURE 8 is a view which is a slightly schematic side illustration of the completed buckle assembly, illustrating the assembly in two alternate conditions,

FIGURE 9 is a perspective view of a connector forming part of an alternative embodiment of the present invention,

FIGURE 10 is a longitudinal sectional view through a buckle, illustrating the buckle connected to the connector illustrated in Figure 9,

FIGURE 11 is a view showing a subsequent stage in the assembly of the alternative buckle arrangement showing the anchor plate, the strap, the connector and the buckle,

FIGURE 12 is a view corresponding to Figure 11 showing a subsequent stage in the assembly of the buckle,

FIGURE 13 is a view corresponding generally to that of Figure 10, but illustrating the fully assembled buckle assembly, and

FIGURE 14 is a view corresponding generally to Figure 13, illustrating the assembly in an alternate position.

Referring initially to Figure 1 of the accompanying drawings, an anchor plate 1 is provided. The anchor plate 1 is formed of a metal strip. One end of the anchor plate 1 is provided with an anchoring aperture 2 adapted to receive a

fastening bolt to secure the anchor plate to an anchoring point within a motor vehicle. The other end of the anchor plate 1 is provided with a mounting aperture in the form of an elongate slot 3 dimensioned to receive part of a webbing strap.

Figure 2 is a diagrammatic view illustrating a length of webbing strap 4. The webbing strap is of uniform width along its length.

Figure 3 illustrates a connector unit 5. The connector unit 5 comprises an elongate element in the form of a substantially rigid finger 6 formed, for example, of metal sheet. One end of the finger 6 is provided with a socket 7, which in the embodiment illustrated is formed by folding an end part of the finger 6 to form a closed loop. The socket 7 receives a transversely extending rod 8 which is rotatable within the socket 7. The opposed ends of the rod 8 are connected to two arms 9, 10 which extend from a mounting element in the form of a mounting plate 11. The mounting plate 11 has two apertures 12, 13 formed therein to facilitate the mounting of a safety-belt buckle to the mounting plate 11 as will be described hereinafter. A relatively large aperture 14 is formed defined between the plate 11, the arms 9, 10 and the rod 8.

Two resilient biasing elements in the form of biasing springs 15 are provided which serve to bias the mounting plate 11 to a predetermined angular orientation relative to the finger 6. In the illustrated embodiment, each spring 15 comprises a helical spring which surrounds the rod 8. Each spring 15 is provided with a terminally extending portion at each end thereof, one extending portion of each spring engaging the finger 6, and the other extending portion of each spring engaging the arms 9, 10. Other forms of biasing spring may be utilised.

Turning now to Figure 4, a buckle 16 is illustrated. The buckle 16 has a housing 17 which defines, at one end, a slot 18 (which is not visible in Figure 4) by means of which a tongue may be inserted into the buckle 16. The buckle 16 includes a depressable button 17 which may be depressed to release the tongue. The buckle 16 may be of a conventional design. The buckle, as will become clear from the following description is intended to be mounted on the above-described mounting plate 11.

Figure 5 illustrates an initial stage in the assembly of a buckle assembly in accordance with the present invention. Initially, a first end 20 of the webbing strap 4 is passed through the elongate slot 3 provided on the anchor plate 1, after which the end 20 of the webbing strap is moved to lie adjacent the main body part of the webbing strap 4. The first end 20 of the webbing strap is then secured to the main body part of the strap by means of two lines of stitching 21, 22 adjacent the super-imposed side edges of the strap 4. Thus the stitching defines a central recess or "pocket" defined between the first end part 20 of the strap 4 and the main body part of the strap 4, in the area located between the two lines of stitching.

Subsequently the finger 6 of the mounting unit 5 is inserted into the pocket between the two lines of stitching so that the mounting plate 11 lies over part of the strap 4, as shown in Figure 6.

Subsequently, as shown in Figure 7, the other second end 23 of the webbing strap 4 is threaded around the rod 8 and the springs 15 of the connector unit 5 and through the aperture 14 defined between the mounting plate 11, the arms 9, 10 and the rod 8. The second end part 23 of the webbing strap is then located to overlie part of the main portion of the strap, and also

part of the already stitched first end part 20 of the strap. Further stitching 24, 25 is used to secure the second end part of the strap 23 in position, some of the stitching 24, 25 passing only through the second end 23 of the strap and the main part of the strap 4, and some of the stitching 24, 25 passing through the second end part 23 of the strap, the first end part 20 of the strap and the main body of the strap. The stitching serves to embrace the finger 6 within the sewn strap 4. The mounting plate 11 projects beyond the end of the stitched strap.

The buckle 16 may be mounted to the mounting plate 11 in the manner shown in Figure 8 using rivets or the like passing through the apertures 12 and 13 in the mounting plate 11 which engage corresponding apertures formed in the housing 17 of the buckle. In Figure 8 the location of the strap 4 and the location of the stitching is shown diagrammatically to facilitate an understanding of the location of the relevant portions of the strap 4.

The biasing springs 15 serve to bias the mounting plate 11 towards an initial position in which the mounting plate 11 is substantially perpendicular to the axis of the finger 6. Thus the buckle 16 initially has the position shown in solid lines in Figure 8 in which the axis of the buckle 16 is substantially perpendicular to the axis of the finger 6. However, the buckle 16 can be moved, against the bias of the spring 15 to the alternate position shown in phantom in Figure 8, in which the buckle 16 is generally in alignment with the finger 6, extending substantially upwardly above the finger 6.

It is to be appreciated that a buckle assembly of the type described may be of particular use for mounting on the rear seat of a motor vehicle. The anchor plate 1 will pass through a gap provided at the back of the squab of the seat and beneath the back-rest of the seat, so that an appropriate bolt may pass

through the anchoring aperture 2 to engage with an anchoring point formed on the body of the vehicle located beneath and behind the rear seat. The anchor plate 1 will extend part-way up through the gap between the squab and the back-rest of the seat, and the webbing strap 4, effectively reinforced by the finger 6, will extend up from the anchor plate 1 to a position adjacent the top of the squab of the rear seat. The buckle 16 will initially lie in a substantially vertical position in which the buckle is unobtrusive, and will not impede a passenger attempting to slide across the rear seat to a central position in the rear seat. For example, the buckle 16 could be initially received within a recess provided in the back-rest of the rear seat. However, the buckle is held ready for use and is easily accessible. When the buckle 16 is to be used, the buckle is grasped and is pulled upwardly, causing the rod 8 to pivot within the socket 7, against the bias the springs 15, until the buckle 16 is substantially in the position shown in phantom in Figure 8. A tongue of a safety-belt may then easily be located within the buckle. When the buckle is no longer in use, the spring-bias provided by the springs 15 will return the buckle to the initial unobtrusive position shown in solid lines in Figure 8.

Turning now to consider Figures 9 to 14, a buckle assembly in accordance with an alternative embodiment of the present invention will now be described.

The alternative buckle assembly again comprises an anchor plate 1 and strap 4 substantially identical to those illustrated in Figures 1 and 2. However, as will be clear from Figure 9, the connector 30 of the alternative arrangement differs significantly from the connector 5 of the arrangement illustrated in Figures 1 to 8. The connector 30 illustrated in Figure 9 is fabricated from a single length of resiliently deformable metal wire 31. The length of metal wire 31 is illustrated as having been bent and deformed into a configuration which

defines a pair of mounting elements 32 and an elongate element 33. Each mounting element 32 takes the form of a loop or hook of wire 34 terminating with an inwardly-turned free end 35 of the wire 31. The loop 34 of each mounting element 32 extends to a respective helically-wound length of wire 36, from which the wire 31 is formed into an elongate loop defining the elongate element 33. As illustrated in Figure 9, the two helically-wound lengths of wire 36 extend inwardly from the respective loops 34 such that the elongate element 33 is located between the two mounting elements 32.

As will therefore be appreciated, the connector 30 illustrated in Figure 9 is configured such that the two mounting elements 32 are formed integrally with the elongate element 33, which is in contrast to the connector 5 illustrated in Figure 3, in which the mounting element 30 is connected to a separate elongate element 6.

The helically-wound lengths of wire 36 serve generally the same purpose as the helical springs 15 of the connector 5 illustrated in Figure 3, in that each helically-wound length of wire 36 provides a degree of resilient bias between the mounting elements 32 and the elongate element 33, whilst permitting pivotal movement of the elongate element 33 about a notional axis relative to the mounting elements 32, against said bias. In its relaxed state (illustrated most clearly in Figure 10), the connector 30 is configured such that the mounting elements 32 extend substantially perpendicularly with respect to the elongate element 33.

Figure 10 also illustrates, in longitudinal section, the buckle 37 of this alternative arrangement. The buckle 37 again comprises a housing 38 which defines, at one end, a slot 39 by means of which a tongue may be inserted into

the buckle 37. The buckle 37 again includes a depressible button (not shown) which may be depressed to release the tongue.

Additionally, the housing 38 of the buckle 37 of this arrangement is provided with a slot or end 40 at the opposite end to the tongue-receiving slot 39, the slot 40 providing access to a longitudinal channel 41 which extends toward first undersurface-slot 42 provided transversely in the underside of the housing 38. At a position between the first undersurface-slot 42 and the end of the housing 38 opposite to the tongue-receiving slot 39, there is provided a second transverse undersurface-slot 43 in the underside of the housing 38, the second slot 43 also communicating with the channel 41.

As also illustrated in Figure 10, the slots 42, 43 provided in the underside of the housing 38, together with the length of channel 41 therebetween, allow connection of the buckle 37 to the connector 30. The wire loops 34 of each mounting element 32 extend into the channel 41 through the first undersurface-slot 42, and extend along the channel 41 to exit the channel 41 through the second undersurface-slot 43, such that the inwardly-directed terminal ends 35 of the wire 31 bear against the underside of the housing 38 to retain the mounting element 32 in position.

Figure 11 illustrates a subsequent stage in the assembly of the alternative buckle assembly, which follows a stage of assembly substantially identical to that illustrated in Figure 5, in which a first end 20 of the webbing strap 4 is passed through the elongate slot 3 provided on the anchor plate 1, after which the end 20 of the webbing strap is moved to lie adjacent to the main body part of the webbing strap 4, and is secured to the main body part of the webbing strap 4 by means of two lines of stitching 21, 22 adjacent the super-imposed side edges of the strap 4. Figure 11 illustrates insertion of the elongate loop 33

of the connector 30 (which is already connected to the buckle 37) into the pocket defined between the two lines of stitching 20, 21 so that the connector 30 and the buckle 37 lie over part of the strap 4.

Subsequently, as shown in Figure 12, the other second end 23 of the webbing strap 4 is threaded through the channel 41 via the first undersurface-slot 42, so as to exit the housing 38 of the buckle 37 through the end slot 40. The end part 23 of the webbing strap 4 is then located to overlie part of the main portion of the strap, and also part of the already stitched first end part 20 of the strap. Further stitching 24, 25 is again used to secure the second end part of the strap 23 in position, with some of the stitching 24, 25 passing only through the second end 23 of the strap and the main part of the strap 4, whilst some of the stitching 24, 25 passes through the second end part 23 of the strap, the first end part 20 of the strap and the main body of the strap. The stitching serves to embrace the elongate loop 31 of the connector 30 within the sewn strap 4.

As illustrated most clearly in Figure 13, a length of slack 43 is left in the region of strap 4 extending between the first lines of stitching 20, 21 and the first undersurface-slot 42 of the channel 41.

The helically-wound lengths of wire 36 serve as biasing springs to bias the mounting elements 32 towards an initial position in which the mounting elements 32 extend substantially perpendicularly to the axis of the elongate element 33. The buckle 37 initially has the position shown in Figure 13 in which the axis of the buckle 37 is substantially perpendicular to the axis of the elongate element 33. However, the buckle 37 can be moved, against the bias of the helically-wound lengths of wire 36, to the alternate position shown in Figure 14, in which the buckle 37 is generally in alignment with the elongate

element 33, extending substantially upwardly above the elongate element 33. The provision of the length of slack 43 (illustrated in Figure 13) allows unhindered movement of the buckle 37 from the position illustrated in Figure 13 to the position illustrated in Figure 14.

It is to be appreciated that the buckle assembly of the type described above with respect to Figures 9 to 14 is again of particular use for mounting on the rear seat of a vehicle in generally the same way as the assembly of Figures to 8.

In the present Specification "comprises" means "includes or consists of" and "comprising" means "including or consisting of".

The features disclosed in the foregoing description, or the following Claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A seat-belt buckle arrangement comprising a seat-belt buckle, a webbing strap and a connector, the connector having an elongate element and at least one mounting element connected to or formed integrally with the elongate element for pivotal movement relative to the elongate element, the or each mounting element being resiliently biased to a predetermined position relative to the elongate element, the buckle being mounted on the or each mounting element, the strap having one end which passes around at least part of the connector, that end being superimposed over a main body portion of the strap, and being secured thereto so that the superimposed strap portions embrace the said elongate element.
2. An arrangement according to Claim 1, wherein the other end of the strap passes through an aperture formed in an anchor plate, the said other end being superimposed with the main body portion of the strap and being secured thereto to embrace part of the elongate element.
3. An arrangement according to Claim 1 or Claim 2, wherein said resilient bias between the or each mounting element and the elongate element is effective to move the buckle to an initial position in which the axis of the buckle is substantially perpendicular to the axis of the elongate element.
4. An arrangement according to any one of the preceding Claims, wherein the elongate element is formed of metal sheet, one end of the elongate element forming a loop which receives a rod which is pivotal relative to the elongate element, the rod extending to and being connected to arms which extend from

the mounting element, the mounting element being constituted by a mounting plate, the or each resilient biasing element engaging the elongate element and a said arm to impart said bias to the mounting element.

5. An arrangement according to any preceding Claim, wherein said resilient bias is effected by at least one resilient biasing element.

6. An arrangement according to Claim 5, as dependent upon Claim 4, wherein the or each said resilient biasing element comprises a helical spring surrounding said rod.

7. An arrangement according to any preceding Claim, wherein said one end of the strap passes through an aperture in the connector.

8. An arrangement according to any one of Claims 1 to 3, wherein the or each mounting element and the elongate element are each formed from a single length of bent resilient wire.

9. An arrangement according to Claim 8, wherein the elongate element is defined by an elongate loop of said wire extending between a pair of hook-shaped formations, each said hook-shaped formation defining a respective mounting element for engagement with the buckle.

10. An arrangement according to Claim 8, wherein the region of said wire forming the elongate element, and the region of said wire forming the or each mounting element are joined by a helically wound region of said wire, the helically wound region of wire providing said resilient bias between the or each mounting element and the elongate element.

11. An arrangement according to any one of Claims 8 to 10, wherein said one end of the strap passes through an aperture in the buckle and around said the or each mounting element.

12. A method of assembling a seat-belt buckle arrangement according to Claim 2 or any Claim dependent thereon, the method comprising the steps of passing the said other end of the strap through an aperture formed in the anchor plate, superimposing said other end and the main body portion of the strap, and securing the adjacent edges of the superimposed strap portions together to define a central pocket, inserting the elongate element of the connector into the pocket, passing the said one end of the strap around at least part of the connector and superimposing the one end of the strap over at least part of the main body portion of the strap, and securing the said one end portion of the strap to the said main body portion of the strap to embrace the elongate element.

13. A method according to Claim 12, wherein said steps of securing comprise the step of stitching said parts of the strap together.

14. A method according to Claim 13, wherein part of the one said end portion of the strap, when passed around at least part of the connector, overlies the said other end of the strap, the stitching serving to interconnect the said one end of the strap, the said other end of the strap and the main body part of the strap.

15. A seat-belt buckle assembly substantially as herein described with reference to and as shown in Figures 1 to 8 of the accompanying drawings.

16. A method of assembling a seat-belt buckle assembly substantially as herein described with reference to Figures 1 to 8 of the accompanying drawings.

17. A seat-belt buckle assembly substantially as herein described with reference to and as shown in Figures 9 to 12 of the accompanying drawings.

18. A method of assembling a seat-belt buckle assembly substantially as herein described with reference to Figures 9 to 12 of the accompanying drawings.

19. Any novel feature or combination of features disclosed herein.

ABSTRACT:

**"IMPROVEMENTS IN OR RELATING TO A SEAT-BELT BUCKLE
ARRANGEMENT"**

A seat-belt buckle arrangement comprises a seat-belt buckle, webbing strap and a connector. The connector has an elongate element which is received within a pocket formed by two super-imposed portions of the strap. A mounting element is provided which is associated with the connector, the buckle being mounted on the mounting element. The mounting element is biased to a predetermined position relative to the elongate element so that the buckle is initially held in a predetermined position relative to the elongate element that forms part of the connector.

1/6

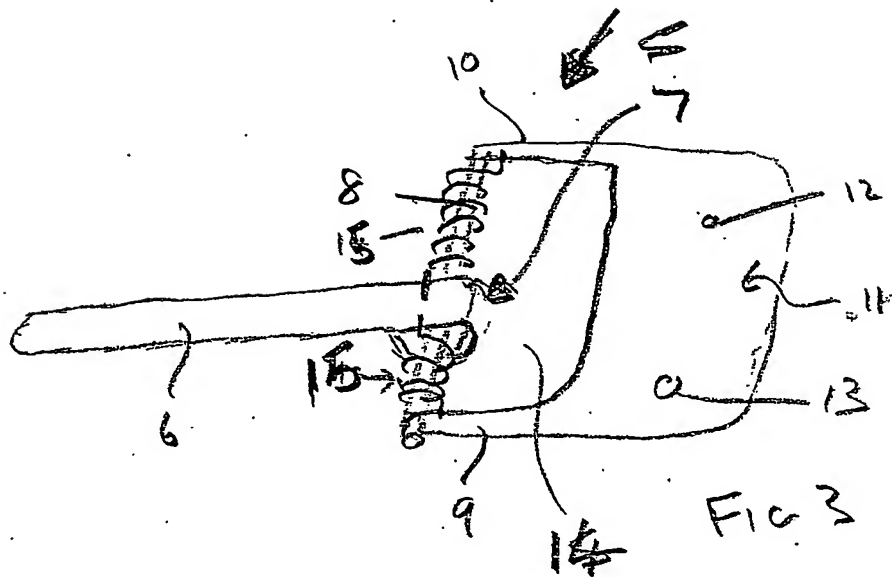
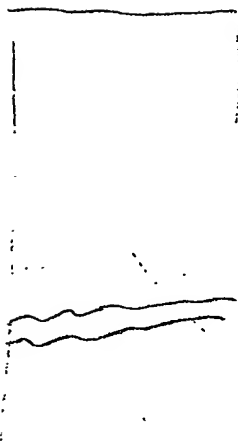
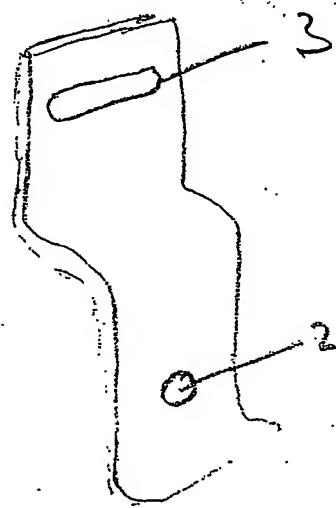


Fig 3



4

Fig 2



1

Fig 1

2/6

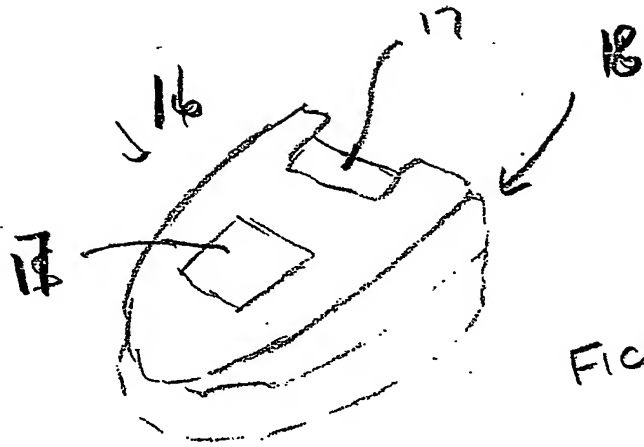


FIG 4

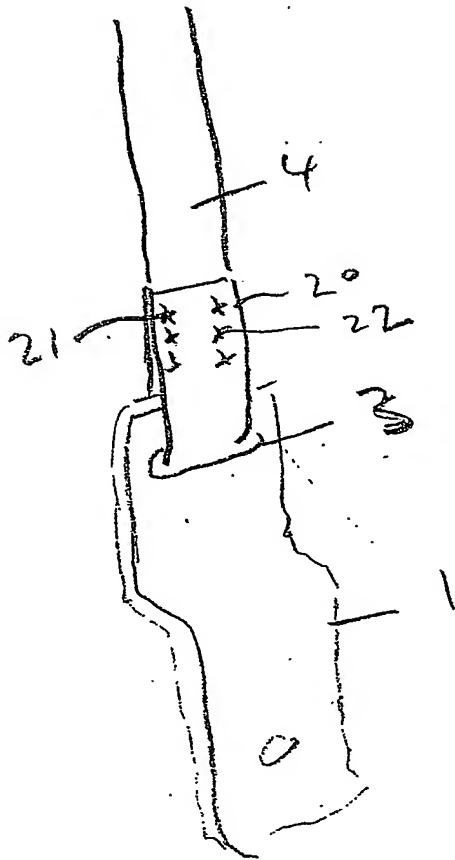


FIG 5

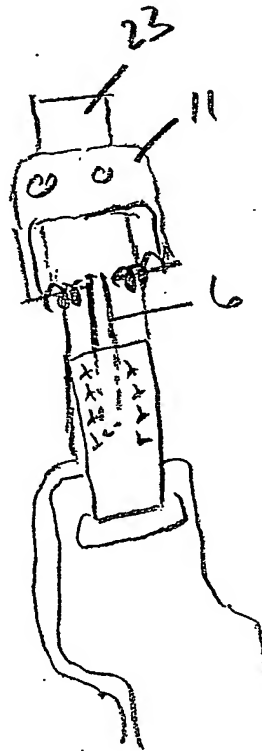


FIG 6

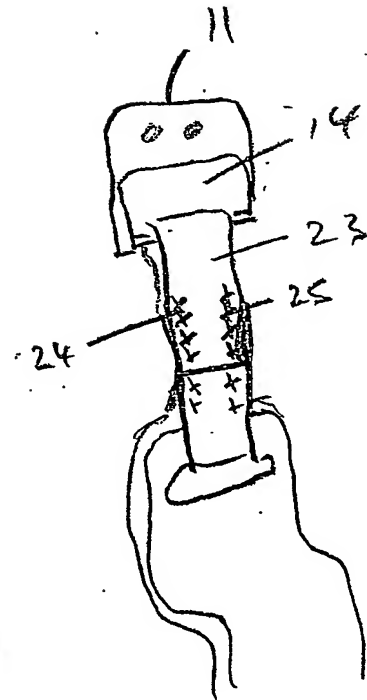
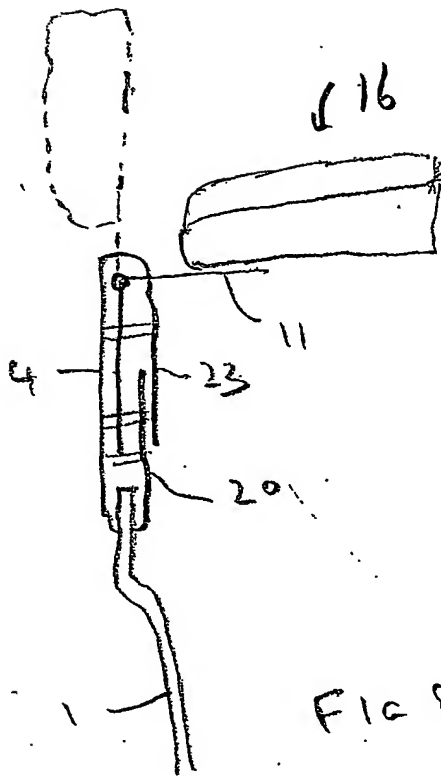
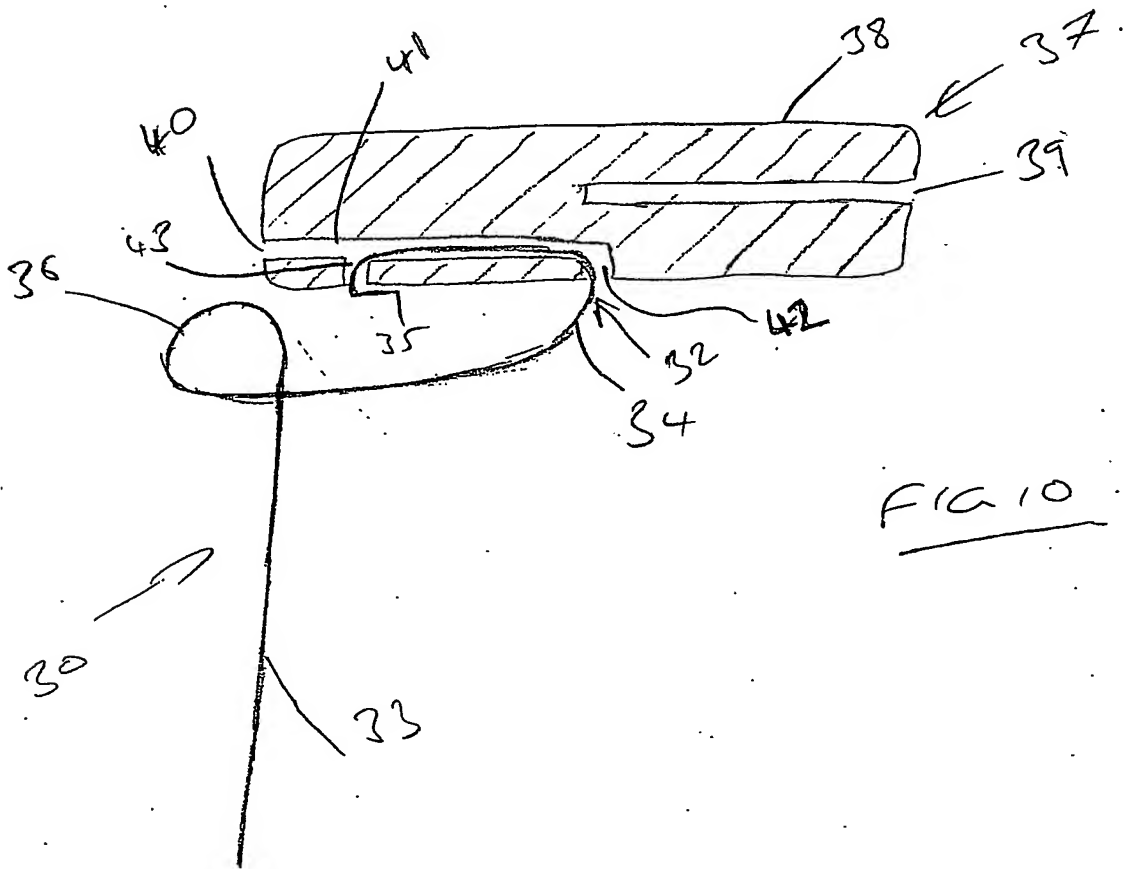
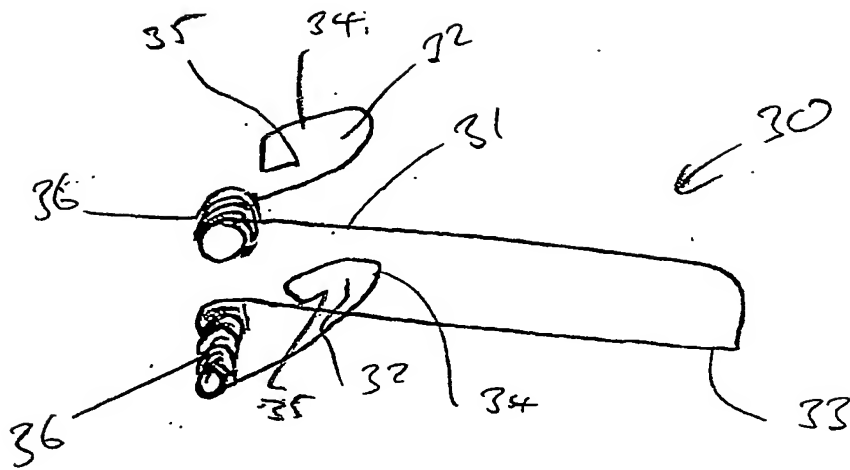


FIG 7

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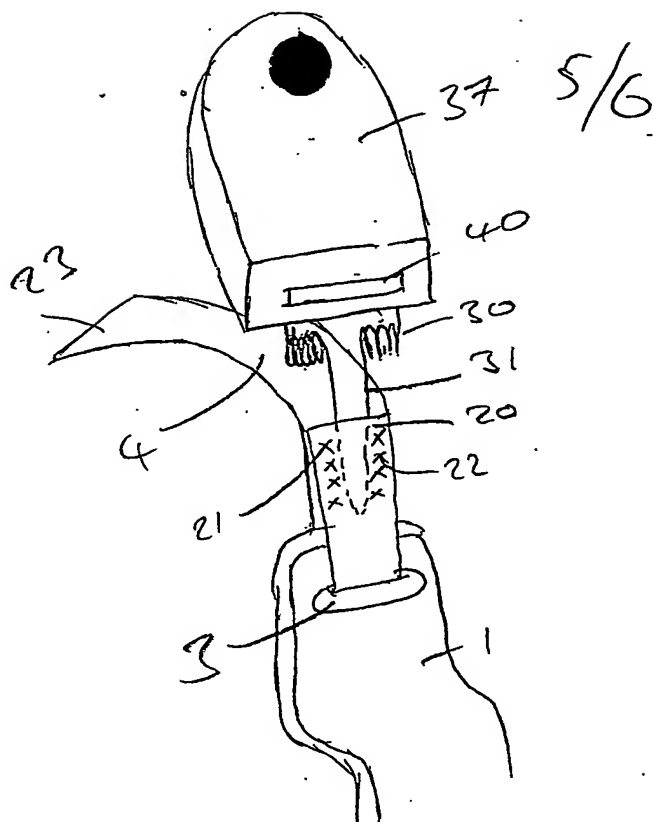


FIG 11

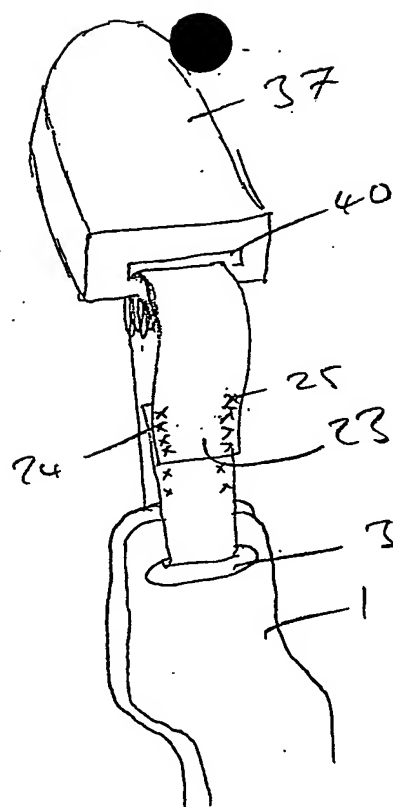


FIG 12

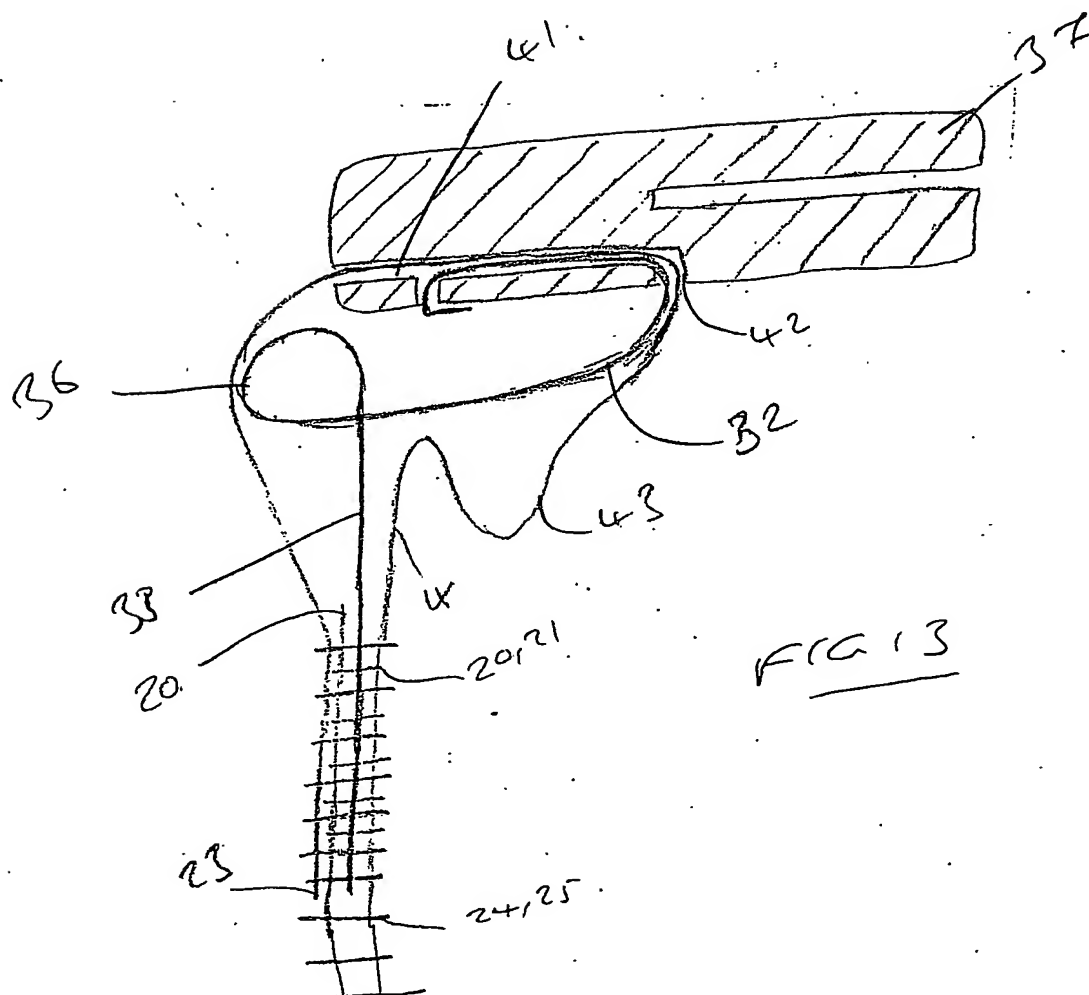


FIG 13

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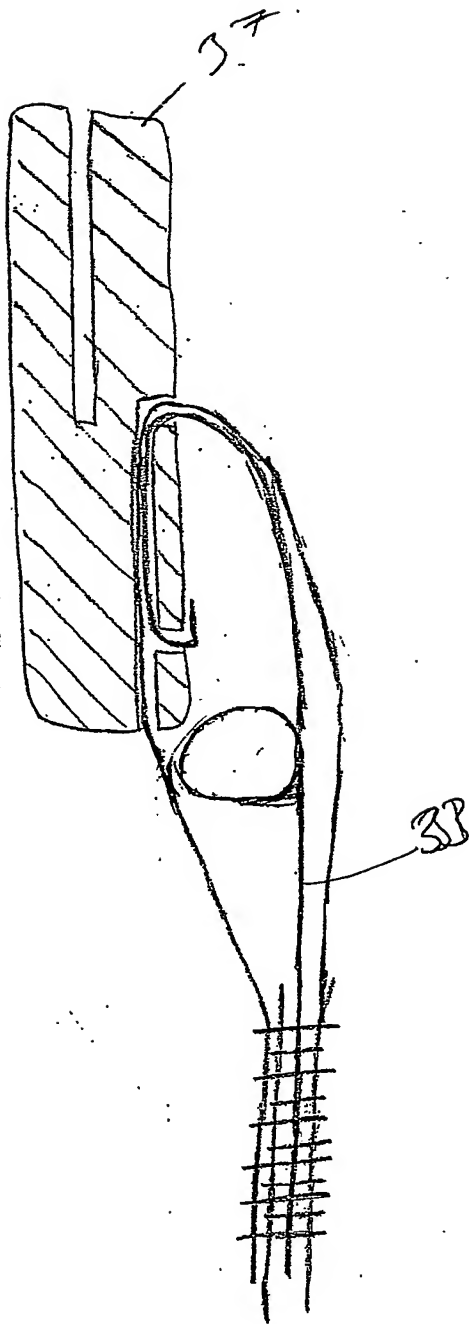


FIG 14

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